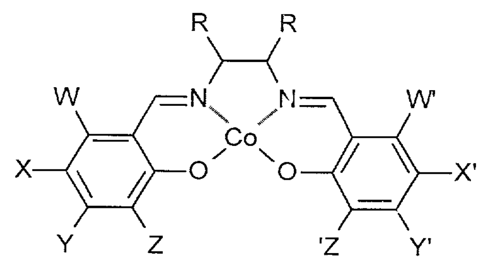
cell by a receptor-mediated process. Co[SALEN] and its derivatives or analogues can be represented by the general formula

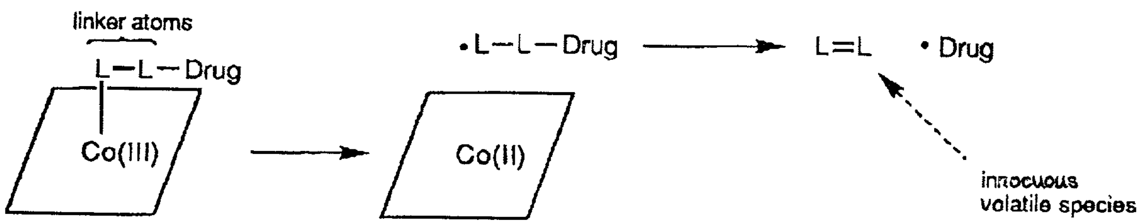


wherein the substitutents may be included or omitted to modulate physical properties of the molecule, e.g., water solubility, stability or λ_{max} -- the wavelength at which the complex absorbs. Thus, the substituents are as follows: R is H, a group which increases water solubility and/or stability or a group for attachment of a targeting molecule and W, W', X, X', Y, Y', Z and Z' are independently H, a group which increases water solubility and/or stability, a group for attachment of a targeting molecule or a group for modified absorbance of energy, or W and X together and W' and X' together are a 4-6 member cyclic or heterocyclic ring, or Y and Z together and Y' and Z' together are a 4-6 member cyclic or heterocyclic aromatic ring. Examples of groups for enhancing water solubility include amino, C_{1-6} alcohol, C_{1-6} carboxyl for any substituent, or also SO_3- for the substitutents other than R. Examples of groups for attachment of a targeting molecule include amino, C_{1-6} alcohol and C_{1-6} carboxyl for any substituent. Examples of groups for modifying absorbance include CH_2OH, CO_2H, SO_3-, amino and nitro for the substitutents other than R. Such groups are useful for increasing the wavelength of light to be used for cleavage of the bioconjugate as described herein, while targeting molecules are useful in selectively targeting the bioconjugate to the desired tissue. Therefore, when used in the context of the present application, the term organocobalt complex, unless specifically identified, shall be inclusive of B_{12} in all its embodiments, including coenzyme B_{12}, Co[SALEN] and other B_{12} or B_{12}-like molecules, the organocobalt complexes defined herein, as well as any derivatives and analogues thereof.

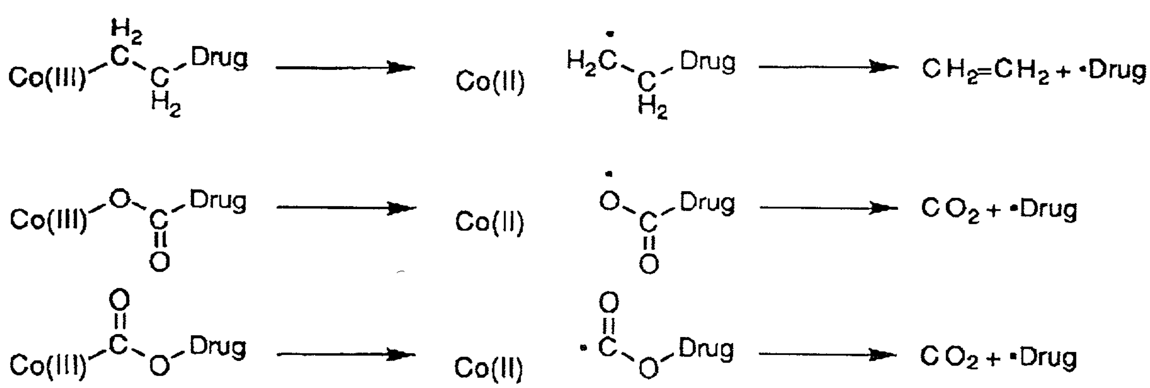
Spacer: an atom or molecule which covalently binds together two components. In the present invention, a spacer is intended to include atoms and molecules which can be used to covaltently bind a bioactive agent to the cobalt atom of an organocobalt complex or to covalently bind a targeting molecule to an organocobalt complex. The spacer must not prevent the binding of the organocobalt complex or the targeting molecule with its appropriate receptor.

Examples of suitable spacers include, but are not limited to, polymethylene [-$(CH_2)_n$, where n is 1-10], ester [bioactive agent attached to O and Co to C = O], carbonate, ether, acetal or any combination of two or more of these units. A skilled artisan will readily recognize other spacers which can be used in accordance with the present invention.

Several of these spacers are useful as a "self-destructing" linker group. That is, some or all of the linkage would be consumed in a fragmentation reaction. This means that, following cleavage of the C-Co bond by photolysis or sonolysis, an additional cleavage will take place several bonds away, leading to the formation of a small, unsaturated (and typically volatile) molecule made up of atoms of the former linker. This is shown schematically below:



The most typical scenario is the subsequent cleavage of a second bond, two bonds removed from the first. Thus, most self-destructive linkers would contain a two-atom unit whose extrusion as a small, gaseous molecule is favorable. Another design feature is to have the new radical species which is generated after the second cleavage step be an especially stable kind of radical. Examples of self-destructing linkers are shown below:



Targeting Molecule: a molecule which is bound by a receptor and transported into a cell by a receptor-mediated process. Examples of suitable targeting molecules include, but are not limited to, glucose, galactose, mannose, mannose 6-phosphate, transferrin,

asialoglycoprotein, α-2-macroglobulins, insulin, a peptide growth factor, cobalamin, folic acid or derivatives, biotin or derivatives, YEE(GalNAcAH)$_3$ or derivatives, albumin, texaphyrin, metallotexaphyrin, porphyrin, any vitamin, any coenzyme, an antibody, an antibody fragment (e.g., Fab) and a single chain antibody variable region (scFv). A skilled artisan will readily recognize other targeting molecules (ligands) which bind to cell receptors and which are transported into a cell by a receptor-mediated process. The present invention is intended to include all such targeting molecules.

The present invention takes advantage of the cellular properties of cobalamin and cobalamin analogues or derivatives, as well as the cellular properties of other targeting molecules. For example, studies have shown that the absorption of physiological amounts of vitamin B_{12} by the gut requires that it be complexed with a naturally occurring transport protein known as intrinsic factor (IF). (Castle, 1953; Fox and Castle, Allen and Majerus, 1972b). This protein is released into the lumen of the stomach by parietal cells in the fundus. Once bound to intrinsic factor, the B_{12}-IF complex interacts with a membrane bound receptor for IF located on the terminal ileum of the small intestine. The receptor-IF-B_{12} complex is then internalized by a process of receptor-mediated endocytosis (RME). Allen and Majerus demonstrated that it is possible to chemically modify B_{12}, couple it to a resin and use the B_{12}-resin to affinity purify IF (Allen and Majerus, 1972a). This finding suggests the possibility of coupling a large macromolecule (such as the resin used by Allen and Majerus, 1972a) to B_{12} while still preserving its ability to interact specifically with intrinsic factor and thus be part of the active transport system. By coupling molecules to B_{12} in such a way as to preserve the ability of B_{12} to interact with intrinsic factor, it was found that the natural uptake mechanism for orally administered B_{12} could be used to deliver various proteins, drugs or other pharmaceutically active molecules from the intestinal lumen to the circulation. It has been found that B_{12} is naturally concentrated in cancer tissue through a similar transport mechanism.

In mammals, B_{12} is transported in the blood by transcobalamin proteins TC-I, TC-II, and TC-III. The major form of B_{12} in the blood is methylcobalamin and the largest store of B_{12} is adenosylcobalamin in the liver. Rapidly dividing cells, including cancer cells, require coenzyme B_{12} for thymidine production during DNA synthesis. It has been reported by Carmel (1975) that, in some patients with tumors, up to 50-fold increases in the major cobalamin transport proteins TC-I and TC-II have been observed. Waxman et al. (1972), report the finding of tumor specific